

TERRA RESOURCES, INC.

IBLA 87-81

Decided November 28, 1989

Appeal from a decision of the Wyoming State Office, Bureau of Land Management, rejecting in part simultaneous oil and gas lease offer W-101714.

Affirmed.

1. Oil and Gas Leases: Known Geologic Structure--Oil and Gas Leases: Noncompetitive Leases

Lands within a known geologic structure of a producing oil or gas field may be leased only after competitive bidding under the provisions of 30 U.S.C. § 226(b) (1982). Where lands are determined to be within such a structure after a simultaneous oil and gas lease drawing but prior to issuance of a lease, a noncompetitive lease application for such lands must be rejected.

2. Oil and Gas Leases: Applications: Generally--Oil and Gas Leases: Burden of Proof--Oil and Gas Leases: Known Geologic Structure--Oil and Gas Leases: Noncompetitive Leases

An applicant for a noncompetitive oil and gas lease who challenges a determination that certain lands are within the known geologic structure of a producing oil or gas field has the burden of showing by a preponderance of the evidence that the determination is in error.

APPEARANCES: Charles A. Rasey III, Denver, Colorado, for appellant; Lowell L. Madsen, Esq., Office of the Regional Solicitor, U.S. Department of the Interior, Denver, Colorado, for the Bureau of Land Management.

OPINION BY ADMINISTRATIVE JUDGE FRAZIER

Terra Resources, Inc., has appealed from an October 3, 1986, decision by the Wyoming State Office, Bureau of Land Management (BLM), rejecting in part its noncompetitive oil and gas lease offer W-101714. Appellant's application was drawn with first priority for parcel WY-504 on the June

1986 list of parcels available for simultaneous filings. BLM rejected appellant's application as to the S\SW^, sec. 20, T. 17 N., R. 102 W., sixth principal meridian, Sweetwater County, Wyoming, on the basis that those lands had been determined, effective May 2, 1984, to lie within the South Baxter Basin Known Geologic Structure (KGS). ^{1/}

BLM based its South Baxter Basin KGS determination upon a geologic report completed on May 1, 1984. In this report, BLM explained that the South Baxter Basin KGS was originally defined on December 2, 1941, with periodic additions over the years due to oil and gas development drilling, and that "[r]ecent drilling activity in the area has extended the presumptively productive limits of the field, necessitating another undefined addition to the existing South Baxter Basin KGS." BLM offered the following reasons for the undefined addition:

Four formations are the major producers in the Baxter Basin area. These formations are, in descending stratigraphic order: the Frontier (Cretaceous), Dakota (Cretaceous), Morrison (Jurassic), and Phosphoria (Permian). The Rock Springs Formation produces from one well in Sec. 12, T.18N., R.102W.

The Frontier Formation is the most widespread and prolific gas producer in the South Baxter area. The major producing interval consists of two continuous sand bodies separated by a highly variable thickness of shale in the upper portion of the formation, referred to as the "2nd Frontier". Usually, only one of the 2nd Frontier sands will produce; however, both sands do produce simultaneously in some wells. The 2nd Frontier sand interval can be identified from logs in almost every well that has penetrated the sequence in the South Baxter area. A stratigraphically lower sand, called the "3rd Frontier", produces locally in a few wells, but this interval is not as widespread or as traceable as the 2nd Frontier interval.

The Dakota Formation is the second-most widespread and prolific gas producer in the area. The Dakota contains three major sand units separated by variable thicknesses of shale. Usually, only one of these sands is productive in any given well. The upper sand and the lower sand are the most widespread producers. Locally, the lower sand is called the Lakota Formation; however, for this report it was not differentiated from the Dakota. The middle sand sequence usually consists of up to two interfingering, discontinuous sands that produce locally near the center of the KGS addition, but cannot be traced towards the north or the south for any great distance.

^{1/} BLM issued appellant's oil and gas lease W-101714, effective Oct. 1, 1986, for the following lands: NW^ SE^, SE^ SE^, sec. 20; W\ NW^, sec. 22; SW^ SW^, sec. 32; SE^ SE^, sec. 34, T. 17 N., R. 102 W., sixth principal meridian, Sweetwater County, Wyoming.

The Morrison Formation is a prominent gas producer in the northern part of the KGS addition. Production occurs from two sand bodies found near the middle of the formation. The interval is traceable from well logs across the northern portion of the KGS area into the North Baxter Basin Field, but tends to disappear towards the south.

Production from the Phosphoria Formation is restricted to three wells near the southern boundary of the KGS. The full productive limits of the Phosphoria are presently unknown because the majority of the wells drilled in the area were not deep enough to penetrate it. All wells that did penetrate the Phosphoria outside of the immediate producing area had good gas shows, except for one well in the SWNW, Sec. 8, T.15N., R.103W., that was dry in the Phosphoria. Production is from a fractured algal dolomite sequence that occurs near the top of the formation. The continuity of the reservoir is unknown due to a lack of data points, but is traceable from logs between the wells that penetrate the Phosphoria in the area.

The boundaries of the undefined addition to the South Baxter Basin KGS were determined based on the net effective reservoir zero-foot isopach lines calculated for each of the four producing formations described above * * *. The net effective reservoir is defined as a subsurface thickness of rock that has sufficient porosity to permit the accumulation of crude oil or natural gas under adequate trap conditions, and is presumptively productive for oil or gas. The zero-foot net effective reservoir isopach line essentially outlines the limits of the trap, be it structural, stratigraphic, or a combination of both types. The net effective reservoir thickness was calculated for each well in the South Baxter Basin area by using any one, or multiple combinations of the following: reports of operation, completion reports, production tests, drill stem tests * * *, IWR's, well logs (electric/induction logs, sonic logs, nuclear/density logs, temperature logs, and other miscellaneous logs as available), P.I. data, and other published and unpublished literature. The undefined addition to the South Baxter Basin KGS hereby includes all 160-acre spacing units (State spacing order), or portions thereof, cut by the composite net effective reservoir zero-foot isopach line based on the Frontier, Dakota, Morrison, and Phosphoria Formations not within an existing KGS * * *.

In its statement of reasons for appeal, appellant challenges BLM's KGS determination on the following bases:

From the S\ SW^ of Section 20, Township 17 North-Range 102 West, Sweetwater County, Wyoming there are three wells up dip that are dry holes. The nearest well, approximately 100 feet up dip from the above mentioned parcel is the Amoco-Champlin 198-A, drilled in 1974 in Section 17 to the Weber. The datum on top of the Frontier Formation is +2269'. The Frontier tested 1795' of

water, the Dakota was not tested, the Nugget tested 5518' of water, and the Weber 1490' SGCW and 1190' GC sulfur water.

The Houston Oil and Mineral well in Section 9 at a datum of top of the Frontier of +2207' was drilled in 1981 and tested the Frontier and recovered 10' GCO, 400' water and GCM and 10' GCM. The Dakota was not tested.

In Section 7 the Amoco-Champlin 198-B was drilled in 1980, has a datum on top of the Frontier Formation of +2561'. This well tested the Frontier and recovered 90' O&GCM, 90' SOCM, and 90' mud. The Dakota tested 792' water, 1677' GCW, 552' M&GCW, 368' GCM, and 810' SGCM.

Since these three wells are up dip of the parcel in question and have tested water in the Frontier, Dakota, Nugget and Weber Formations there is little doubt that the parcel in question is not part of the producing Baxter Basin geological structure.

BLM prepared a report dated November 20, 1986, responding to appellant's statement of reasons, which counsel for BLM incorporated into its answer. In this report, BLM responded point for point to appellant's arguments, arguing as follows:

Figure 1 shows the location of the rejected portion of the subject parcel in relationship to the interpreted limits of the net effective reservoir that defines the KGS boundary in that area. Figure 2 is a portion of the net effective reservoir isopach map prepared for the Dakota Formations showing the well locations in the vicinity of the subject parcel.

All of the wells shown in Figure 2, and specified by the appellant, are located on the eastern flank of a very large anticlinal structure known as the Rock Springs Uplift. The appellant's assertions regarding the structural portion of the parcel and wells are correct, but they are probably not relevant in this case. The available well data, as well as the published literature, indicate that the hydrocarbon trapping mechanism in the Camel Rock Field and adjacent vicinity is primarily stratigraphic. This situation was noted in the original geologic report compiled during the 1984 KGS determination effort * * *. As stated in the original report, "the stratigraphic traps are interpreted to be the result of porosity/permeability variations within the reservoir rocks". In such a case, the position of a well on the structure will have a negligible effect on its productive capabilities.

As shown by Figure 2, there is a conspicuous lack of well data points in T.17N., R.102W., making a detailed analysis of the Dakota Formation reservoir in this area difficult at best. Figure 2 also shows the thickness of the Dakota reservoir interpreted from well logs and other data sources for each well. It

is significant to note that two out of the three wells referred to by the appellant in the Statement of Reasons did not even test the Dakota Formation.

Well 1 on Figure 2 is a recently abandoned gas shut-in well drilled in 1980 by Houston Oil and Minerals in the Camel Rock Field. The well was completed in the Dakota Formation and showed an initial potential of 152 MCFGPD. The well was apparently shut-in after completion and retained that status until its abandonment in 1985. Figures 3 and 4 give the details on this well.

Well 2 on Figure 2 is the well discussed in the first paragraph of the appellant's Statement of Reasons. Figure 5 shows the test details of this well. As stated by appellant, and supported by the data, "the Dakota was not tested...", at this location.

Well 3 on Figure 2 is another Houston Oil and Mineral's well drilled in Section 1, T.16N., R.103W., in 1980. A DST of the Dakota at this location yielded gas to surface in 30 minutes at the rate of 11 MCFGPD. Figure 6 provides additional details on this well.

* * * * *

The upper portion of Sand "A" on Figure 7 immediately draws one's attention due to its similarity in gamma ray log characteristics between all three wells. This portion of Sand "A" was perfed in Well 1 and the CN/FD log trace from this well indicates that the sand is gas-bearing; the conclusion is that the upper part of Sand "A" is contributing significantly to the total production of the well.

This sand zone is recognizable in Well 2; however, no formation tests were performed on this zone which could have helped establish whether or not the sand was indeed gas-bearing. The CN/FD log characteristics do not clearly indicate the presence of hydrocarbons as in Well 1. Since the available data do not conclusively indicate the productive potential of the Dakota Formation at this location, this well was considered to be dry. It was assigned 0 feet net effective reservoir thickness and placed at the limit of the presumptively productive strata during the 1984 KGS study
* * *

Sand "A" is also recognizable in Well 3 and displays CN/FD log characteristics very similar to those found for this zone in Well 1. Indeed, this zone was shown to be gas-bearing in Well 3 through a positive DST, establishing the existence of presumptively productive reservoir at this location.

[1] Section 17 of the Mineral Leasing Act of 1920, as amended, 30 U.S.C. § 226(b) (1982), provides that "[i]f the lands to be leased are within any known geological structure of a producing oil or gas field, they shall be leased to the highest responsible qualified bidder by competitive bidding * * *." See 43 CFR 3100.3-1 (1987); 43 CFR Subpart 3120 (concerning competitive leases). The regulation specifically governing simultaneous noncompetitive oil and gas lease applications for lands within a KGS provides:

If, prior to the time a lease is issued, all or part of the lands in the offer are determined to be within a known geological structure of a producing oil or gas field, the offer shall be rejected in whole or in part as may be appropriate and the lease, if issued, shall include only those lands not within the known geological structure of a producing oil or gas field.

43 CFR 3112.5-2(b) (1987). It is well settled that a noncompetitive lease application for lands designated within a KGS must be rejected where lands embraced in that application are designated as within a KGS prior to issuance of the lease. See, e.g., Lawrence A. Egan, 104 IBLA 57 (1988); Leonard Luning, 87 IBLA 123 (1985); John P. Brogan, 85 IBLA 379 (1985); Evelyn Ruckstuhl, 85 IBLA 69 (1985). This Department has no authority to issue a noncompetitive lease for lands within a KGS. McDonald v. Clark, 771 F.2d 460 (10th Cir. 1985); McDade v. Morton, 353 F. Supp. 1006 (D.D.C. 1973), aff'd, 494 F.2d 1156 (D.C. Cir. 1974).

[2] An applicant for an oil and gas lease who challenges a determination that certain lands are situated within the KGS of a producing oil and gas field has the burden of showing the determination is in error. Lawrence A. Egan, *supra*; Evelyn D. Ruckstuhl, *supra*; Reed International, 80 IBLA 145 (1984); R. C. Altrogge, 78 IBLA 24 (1983). The burden on appellant is to show by a preponderance of the evidence that the determination is erroneous. See Bender v. Clark, 744 F.2d 1424 (10th Cir. 1984).

The term "known geological structure" is defined as "technically the trap in which an accumulation of oil or gas has been discovered by drilling and determined to be productive, the limits of which include all acreage that is presumptively productive." 43 CFR 3100.0-5(l) (1987). The Secretary of the Interior has historically delegated the responsibility for determining the existence and extent of a KGS to his technical expert in the field. When that expert makes a determination that lands qualify for a KGS, the Secretary is entitled to rely upon that reasoned opinion. Bruce Anderson, 63 IBLA 111 (1982). The Board has held that a KGS determination reflects the existence of a continuous entrapping structure on some part of which there is production, or of numerous related but nevertheless independent stratigraphic as well as structural traps. A KGS designation of certain land may be made on the basis of drill stem tests, not just completed producing wells, which indicate that a reservoir which extends under such land is productive. Thunderbird Oil Corp., 91 IBLA 195 (1986), aff'd sub nom. Planet Corp. v. Hodel, Civ. No. 86-679 HB (D.N.M. May 6, 1987). However, it is not a guarantee that all lands included

therein are commercially productive. See, e.g., Lawrence E. Egan, supra; Evelyn D. Ruckstuhl, supra; Robert G. Lynn, 61 IBLA 153 (1982).

Upon review of the record, including the submissions by counsel for BLM, we conclude that appellant has not shown by a preponderance of the evidence that the rejected lands embraced in the lease offer are not within the KGS.

Therefore, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, the decision appealed from is affirmed.

Gail M. Frazier
Administrative Judge

I concur:

Will A. Irwin
Administrative Judge